

GROSS GODS AND ICKY ATHEISM: DISGUST RESPONSES TO REJECTED RELIGIOUS
BELIEFS

BY

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THESIS

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ABSTRACT

Disgust is an emotion that plays an important role in the maintenance and protection of physical and moral purity (Rozin, Lowery, Imada, & Haidt, 1999b). Using a repeated taste-test paradigm, the present research extends recent work on moral cognition by investigating disgust reactions to rejected religious beliefs. In Experiment 1, Christian participants rated a beverage as tasting more disgusting after writing a passage from the text of the Qur'an or Richard Dawkins' *The God Delusion* than a control text. In Experiment 2, Christian participants rated a drink as tasting more disgusting after writing a passage from the Qur'an than a control passage, but the effect was eliminated after participants physically washed their hands. Participants writing a passage from the Bible showed the opposite effect of more disgust after washing their hands, indicating an aversive reaction to physical cleansing after contact with a source of moral purity. These results provide evidence that contact with a rejected religious belief elicits disgust and that both negative *and* positive moral contagions can be removed through physical cleansing. The implications of the results are discussed, including the possibility that holding *true beliefs* is an important component of one's sense of moral purity, and that disgust helps protect these culturally valued truths.

TABLE OF CONTENTS

| | |
|-------------------------------------|----|
| CHAPTER 1: INTRODUCTION | 1 |
| CHAPTER 2: EXPERIMENT 1 | 9 |
| CHAPTER 3: EXPERIMENT 2 | 15 |
| CHAPTER 4: GENERAL DISCUSSION | 21 |
| REFERENCES | 24 |
| APPENDIX A | 28 |
| APPENDIX B | 29 |
| APPENDIX C | 30 |

CHAPTER 1

INTRODUCTION

The essence of religious feeling has nothing to do with reason, or atheism, or crime, or acts of any kind—it has nothing to do with these things—and never had. There is something besides all this, something which the arguments of the atheists can never touch. But the principal thing, and the conclusion of my argument, is that this is most clearly seen in the heart...

-From *The Idiot*, by Fyodor Dostoyevsky

Imagine stumbling to the refrigerator late at night, half asleep, looking for a refreshing drink of cold milk. You reach for the carton and take a gulp, only to realize that the milk has been expired for weeks. How would you respond? Now, imagine that you are in a lab room of a nondescript psychology building. Some researchers have put together a friendly economic game for you to play with another person. \$10 has been given to the other person to distribute between the two of you however they would like, but they only offer you \$1 (and opt to keep the other \$9 for themselves). How would you respond?

As it turns out, these two events share something in common. The former is offensive to our physical senses of taste and smell, whereas the latter is offensive to our moral senses, but both are literally *disgusting* (Chapman, Kim, Susskind, & Anderson, 2009). These actions constitute a violation of what has been called *the ethic of purity or divinity* (Rozin et al., 1999b; Shweder, Much, Mahapatra, & Park, 1997): acts that defile the mind/body, or violate the natural order of things. One thus far under investigated domain in the study of moral purity, however, has been religious beliefs. As the quote at the beginning of this chapter suggests, religious beliefs are often associated with *feelings* more so than *reasoning*, indicating that emotions (like disgust) may play an important role in people's subjective interpretation of information as well as actions. In other words, we may be disgusted by bad food, bad actions *and* bad information.

In this paper I begin with a brief review of recent theory and research on morality (for an in-depth review, see Haidt & Kesebir, 2010), focusing primarily on the emotion of disgust and its relation to violations of the ethic of purity. After presenting this theoretical foundation and reviewing past research, I present two experiments that investigate whether contact with rejected religious beliefs constitutes a violation of the ethic of purity and is thus literally disgusting.

1.1 Moral Foundations

The present research has been strongly influenced by two fairly recent developments in the scientific study of morality. The first has been an increased acceptance of *the principle of intuitive primacy* (Haidt, 2001, 2007; see also, Damasio, 1994; Zajonc, 1980). That is, we do not often decide what is right or wrong on the basis of conscious, rational reasoning, but rather it is our affect-laden intuitions that are the primary causes of moral judgment. The second has been an increased recognition of *a broader moral domain* that expands beyond the traditionally individual-centered concerns for justice (Kohlberg, 1969) and care (Gilligan, 1982). New theories of morality have aimed to capture both these individual-centered concerns, as well as the social-centered concerns often prescribed by one's culture (e.g., Shweder et al., 1997).

Moral Foundations Theory (MFT) has provided an up-to-date synthesis of these two insights (Haidt & Joseph, 2004; Haidt & Graham, 2009). Drawing from centuries of moral theory and research, researchers have proposed that the human mind is equipped with (at least) five sets of foundations that form the intuitive basis of our moral judgments: 1) Harm/Care, 2) Fairness/Reciprocity, 3) Ingroup/Loyalty, 4) Authority/Respect, and 5) Purity/Sanctity. These five foundations are said to constitute the innate “first draft” of our moral mind—each having evolved to solve various problems faced by our ancestors—and allow for the automatic recognition of (and appropriate response to) important patterns in the social world. The

harm/care foundation, for example, is proposed to be closely related to the theory of kin selection (Hamilton, 1964) and solved the challenge of caring for and protecting offspring/kin through the evolution of intuitions and emotions that made us sensitive to the suffering of others. As another example, the fairness/reciprocity foundation—also closely related to the theory of reciprocal altruism (Trivers, 1971)—is proposed to have solved the problems inherent in extending cooperation beyond offspring and kin via automatic concerns for justice; cooperation could be reciprocated with unrelated others who acted fairly, while exploitation could be avoided by detecting, punishing, and monitoring patterns of selfishness in cooperative exchanges.

Of primary importance to the current research is the purity/sanctity foundation. This foundation is proposed to have evolved first to avoid physical threats like microbes and disease via automatic intuitions that made us sensitive to the contact history of people and food. It has since expanded to apply in a socio-moral context as well, evident in our intuitive desires to live in a spiritually pure, clean, or sanctified manner (Haidt & Graham, 2009). Thus despite being harmless in terms of both intentions and consequences, some behaviors may still be viewed as morally wrong if perceived as “impure” (e.g., cleaning the bathroom with your nation’s flag, eating the family pet, or wearing the sweater of a convicted murderer; Haidt, Koller, & Dias, 1993; Rozin, Markwith, & McCauley, 1994). Important for the present research, disgust has been strongly implicated as the moral emotion of this foundation (Rozin et al., 1999b), serving to protect both the physical and spiritual body from harmful influences. Disgust has even been dubbed “the body and soul emotion” for its role in providing the affective input for the intuitions that inform us of physical and moral impurities (Rozin, Haidt, & McCauley, 1999a).

1.2 Literature Review

Despite being a relatively new area of interest, an impressive body of experimental research has investigated the relation between disgust and moral purity. Broadly speaking, this past work can be broken down into three areas: the *measurement* of disgust in response to moral violations, the *manipulation* of disgust and its effect on moral judgments, and the *embodiment* of physical purity as a metaphor for moral purity.

1.2.1 Measuring Disgust

In support of the evolutionary hypothesis that disgust is a body *and* soul emotion, many fMRI studies have discovered that socio-moral violations (e.g., reading descriptions of incest, or being treated unfairly) activate areas of the brain that are also associated with more primitive forms of disgust (Borg, Lieberman, & Kiel, 2008; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). Even mere exposure to the photographs of members of extreme out-groups (e.g., the homeless) has been shown to activate the neural architecture associated with disgust (Harris & Fiske, 2006). Moreover—and of special relevance to the present research—Harris, Sheth, and Cohen (2008) were among the first to investigate the processing of true vs. false beliefs at the level of the brain. They simply asked participants to categorize a variety of statements as true, false, or unknown while being scanned in an fMRI (e.g., *Children should have no rights until they can vote; A Personal God exists, just as the Bible describes; Wisconsin is on the West Coast of the United States*). In comparison to sentences categorized as true or unknown, these researchers found that participants reading false statements showed an increased BOLD response in the anterior insula and left frontal operculum; areas of the brain that have previously been linked to taste perception and disgust (Harris et al., 2008).

Further demonstrations of disgust in response to moral violations come from studies using behavioral and self-report measures. Participants in one study, for example, were found to display the same disgust related oral-nasal rejection response after tasting sour liquid, viewing pictures of contaminants, or being treated unfairly in an economic game (Chapman et al., 2009). Participants have also been found to self-report affective reactions of disgust in response to out-groups that threaten one's moral ideals (Cottrell & Neuberg, 2005), and disgust is reported as the emotion most likely to be elicited by purity violations such as eating human flesh or shaking hands with someone that has been in an incestuous relationship (Gutierrez & Giner-Sorolla, 2007; Rozin et al., 1999b).

1.2.2 Manipulating Disgust

Several researchers have also established a causal relation between disgust and moral purity by manipulating disgust and measuring its effect on different types of moral judgments. In these studies participants are made to experience disgust by asking them to watch a disgusting video (Horberg, Oveis, Keltner, & Cohen, 2009), sit in a dirty work room filled with trash and pizza boxes (Schnall, Haidt, Clore, & Jordan, 2008b), smell an unpleasant fart (Schnall et al., 2008b), or upon reading a certain word as induced through post-hypnotic disgust (Wheatley & Haidt, 2005). These disgust manipulations led participants to make more harsh moral judgments (Schnall et al., 2008b; Wheatley & Haidt, 2005), and increase their condemnation or approval of purity violations (e.g., sexual promiscuity) and virtues (e.g., eating healthy), respectively (Horberg et al., 2009).

1.2.3 Embodiment of the Physical/Moral Purity Metaphor

A final line of research has demonstrated that the everyday relation between physical cleanliness and moral purity (e.g., having a “clean conscience” or “dirty hands”) is not simply a

metaphor. Zhong and Liljenquist (2006), for example, showed that participants experienced an increased desire to physically cleanse themselves after their moral purity had been threatened by asking them to recall or write about an unethical deed. In other words, making participants feel morally unclean made them want to physically cleanse themselves.

In another study, Schnall, Benton, & Harvey (2008a) showed participants a video intended to elicit disgust (“the toilet scene” from the movie *Trainspotting*). Immediately after watching the video, half of the participants were able to wash their hands before making some moral judgments, while the other half were not able to wash their hands. Results showed that participants who washed their hands made less severe moral judgments than participants who did not, suggesting that physical cleansing made participants feel more pure and thus less sensitive to purity violations described in the moral vignettes.

Finally, Lee and Schwarz (2010) have demonstrated that the link between physical and moral purity is modality specific—that is, people tend to want to clean the part of their body that has transgressed. In these studies, participants were asked to lie (or tell the truth) by either leaving a voice mail message or typing an e-mail. Subsequently, participants’ desire for hand-sanitizer and mouthwash was measured. Participants who lied in a voice-mail message (i.e., transgressed with their mouth) showed an increased preference for mouthwash, whereas participants who lied by typing an e-mail (i.e., transgressed with their hands) showed an increased preference for hand sanitizer.

Taken together, these three lines of research on moral purity (i.e., the *measurement* of disgust, the *manipulation* of disgust, and the *embodiment* of the physical/moral purity metaphor) suggest that disgust functions as an intuitive guide that motivates the avoidance of many different types of harmful influences, and plays an important role in our subjective experience of

right and wrong. Further, this research also suggests that purity violations literally make people feel unclean, and that physical cleansing can lead to increased feelings of moral purity.

1.3 The Present Studies

The present research examines the role of disgust in the context of rejected religious beliefs. If disgust can be elicited by purity violations such as those described above, we may also expect contact with morally impure *beliefs* to be perceived as a violation of the ethic of purity (e.g., “unclean thoughts”) and rejected by the same intuitive emotional mechanism. There are several reasons to anticipate this finding. First, the deities of large-scale religious societies are notoriously concerned with the cleanliness of their followers’ minds and bodies (Graham & Haidt, 2010, p. 144). Religious rituals all throughout the world (e.g., baptism or ablution prior to prayer) are literal acts of bodily cleansing intended to symbolically purify the spirit and prepare the believer for communion with God. Living in accord with a sanctified moral code thus contributes to one’s sense of moral purity, and any violation of this moral order may be perceived as a threat to that purity and elicit disgust.

Second, one of the defining features that delineate one religion from another is the beliefs to which its group members adhere. And while some religions may emphasize their beliefs as a defining feature of religious affiliation more than others (Cohen, Siegel, & Rozin, 2003), faith in a given culturally prescribed belief is a virtue rewarded with acceptance and inclusion. Moreover, these group-defining beliefs tend to have a strong moral component—that is, there are “right” and “wrong” beliefs to hold, and there is a perceived moral consequence for believing (e.g., eternal reward) or disbelieving (e.g., eternal torture) the prescribed truth.

Given this evidence that religion is associated with purity concerns, I reasoned that any contact with impure information may be perceived as a threat to one’s spiritual cleanliness and

rejected on that account. Further, as reviewed above, because the emotion of disgust has been uniquely associated with purity violations, I expected contact with a rejected religious belief to elicit a disgust response.

Two experiments addressed this hypothesis. Using a repeated taste-test paradigm, disgust ratings of two identical beverages were measured before and after hand-copying a passage from a religious, atheist, or control text. I predicted that participants would rate the second beverage to taste more disgusting than the first after exposure to a rejected religious passage (Experiment 1), and that physical cleansing would eliminate the effect by symbolically removing the moral impurity (Experiment 2).

CHAPTER 2

EXPERIMENT 1

2.1 Overview

Experiment 1 investigated disgust responses to rejected and neutral texts. Specifically, I was interested in whether contact with a rejected belief system (i.e., Islam and Atheism among Christian participants) would be perceived as a threat to one's moral purity. To examine this hypothesis, participants in Experiment 1 were randomly assigned to one condition of a single factor between subjects design (Qur'an/*The God Delusion*/Dictionary). I predicted that writing a passage from the Qur'an and Richard Dawkins' *The God Delusion* would elicit disgust, whereas contact with the Dictionary would not because the information should not pose a threat to one's moral purity.

2.2 Method

2.2.1 Participants

Participants in Experiment 1 and Experiment 2 were recruited through the Psychology Subject Pool at the University of Illinois at Urbana-Champaign. Using pre-screening measures administered to the Subject Pool, only participants who reported their religious affiliation as "Christian" could volunteer to participate. This population was targeted for two reasons. First, Christianity is the most widespread religion on campus, making Christian participants more readily accessible relative to the followers of other religions. Second, religious identity should play an important role in whether one finds another belief system to violate the ethic of purity. Because Christianity, Islam and Atheism are all competing for the same explanatory space (e.g., the origin of the cosmos, the nature/existence of God, etc.), I reasoned that a participant who

explicitly defined themselves as a “Christian” is likely to perceive these rejected beliefs as aversive and potentially threatening to their own moral purity.

88 self-reported Christian undergraduates participated for partial course credit. Six people were excluded for either failing to follow directions or guessing the hypothesis, leaving 82 participants (29 men, 53 women; mean age = 19) included in the analysis.

2.2.2 Repeated Taste-Test Paradigm

Participants were told that they would complete two separate studies: a consumer marketing survey, and an investigation into the relation between handwriting and personality. This cover-story allowed a measure of participants’ rating of a lemon-water solution on two separate occasions: once before and once after contact with a rejected or neutral passage.

2.2.2.1 Lemon-Water Solution

A solution consisting of 1 cup of lemon juice concentrate and 1 gallon of water was pre-tested among a separate sample of 29 undergraduates. Participants rated how disgusting the beverage tasted using a 7-point scale (1 = *not at all*; 7 = *extremely*). The beverage was rated at the midpoint of the scale ($M = 3.6$, $SD = 1.63$).

2.2.3 Procedures

Participants were seated in a private laboratory room in front of a computer. Instructions were given briefly by the experimenter, and then participants were left alone to follow instructions and give responses on the computer. The experimenter gave participants a sheet of paper and a pen for the handwriting sample, and two cups of the lemon water solution (labeled “A” and “B”) they were told would be used for the consumer marketing portion of the study. Participants first tasted beverage “A” and rated the drink on how disgusting it tasted on a 7-point scale (1 = *not at all*; 7 = *extremely*), along with some additional questions about the beverage

(e.g., sweetness; bitterness) and measures of their current positive/negative affect on a 5-point scale (1 = *very slightly/not at all*; 5 = *extremely*) (Thompson, 2007; see Appendix A).

Next, participants were told that they would complete the handwriting portion of the study before tasting the second drink, ostensibly to allow time to cleanse their palate. Participants completed a six-item religiosity scale (Shariff, Cohen, & Norenzayan, 2008) to activate their religious identity (see Appendix B). Next, one of three passages appeared on the screen. Passages were taken from The Qur'an (Surah 47: 1-2), Richard Dawkins' (2006, p. 31) *The God Delusion*, and the preface of Merriam-Webster's dictionary, purposefully selected to be strong affirmations of the specific beliefs (see Appendix C). Participants hand-copied the passage, then tasted and rated beverage "B" using the same measures as before, and completed a 44-item personality inventory (e.g., *I am someone who is reserved*) with items rated on 5-point scales (1 = *disagree strongly*; 5 = *agree strongly*) (John, Donahue, & Kentle, 1991) included to uphold the cover-story.

2.3 Results

A disgust difference score was computed for each participant by subtracting the disgust rating of beverage A from beverage B, so that values greater than zero indicate that beverage B was rated more disgusting. These disgust difference scores were submitted to a single factor ANOVA on condition (Qur'an/*The God Delusion*/Dictionary). The predicted effect of condition was significant $F(2, 79) = 4.8, p = .01$ (see Figure 1). Post-hoc comparisons using Bonferroni correction showed that the disgust difference scores were significantly higher in the Qur'an ($M = .62, SD = 1.3, p = .02$) and Dawkins ($M = .48, SD = 1.4, p = .05$) conditions relative to the Dictionary condition ($M = -.34, SD = 1.1$), but the Qur'an and Dawkins conditions did not differ from one another ($p = 1$).

Similar difference scores were computed for the other drink ratings, but there was no evidence of any significant differences in these ratings across conditions: Bitter $F(2, 79) = .18, p = .80$; Delicious $F(2, 79) = 2.9, p = .06$; Sour $F(2, 79) = 1.4, p = .26$; Sweet $F(2, 79) = .27, p = .77$.

2.3.1 Religiosity Scale

The religiosity scale showed strong reliability ($\alpha = .96$; $M = 3.5$, $SD = 1.0$), and so the six items were averaged to create a composite measure of religiosity. To examine any effect of religiosity, disgust difference scores were submitted to a single factor ANOVA on condition (Qur'an/*The God Delusion*/Dictionary) with the composite measure of religiosity as a covariate. The predicted effect of condition remained significant $F(2, 78) = 4.8, p = .01$. There was no main effect of religiosity or a religiosity x condition interaction.

2.3.2 Affect

Composite positive and negative affect scores were computed by averaging ratings made after tasting beverage A (PA $\alpha = .72$, $M = 2.8$, $SD = .73$; NA $\alpha = .72$, $M = 1.4$, $SD = .46$) and after tasting beverage B (PA $\alpha = .75$, $M = 2.7$, $SD = .77$; NA $\alpha = .81$, $M = 1.4$, $SD = .55$). Including difference scores of these composite positive/negative affect values as covariates in the original analysis revealed that more negative affect after drink B than drink A was associated with rating drink B more disgusting than drink A ($\beta = 1.1$), $t(77) = 2.6, p = .01$. However, the effect of condition remained significant ($F(2, 77) = 5.2, p = .007$), indicating that negative affect alone cannot account for the present findings (no other main effects or interactions were found).

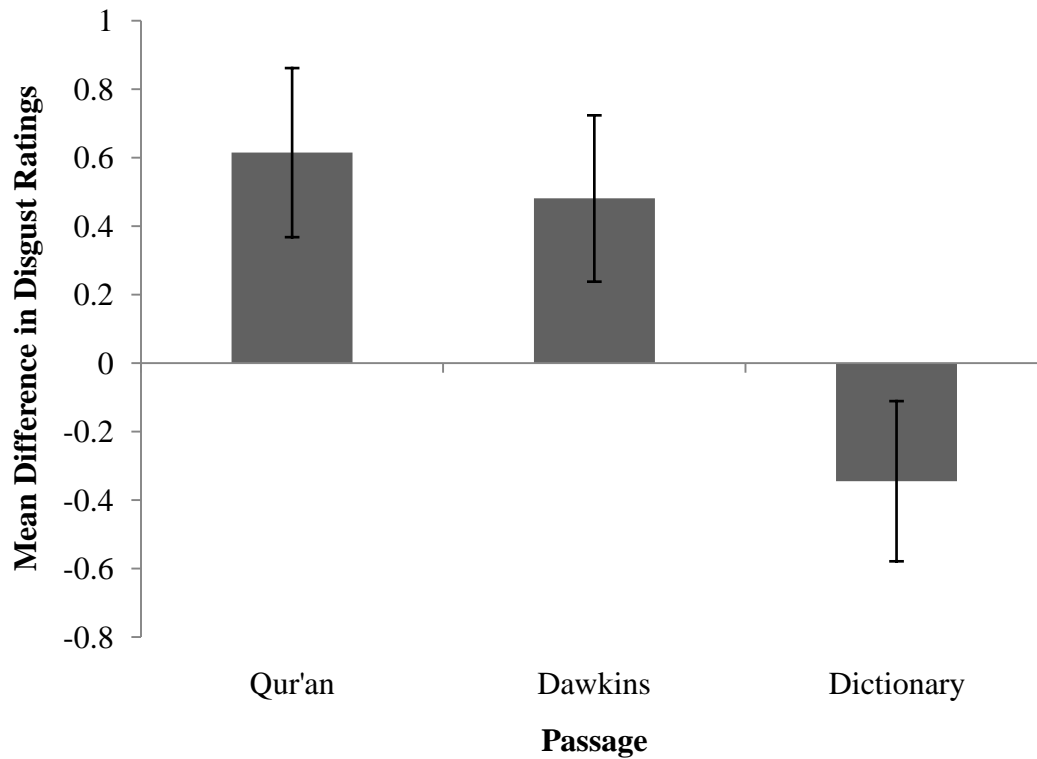
2.4 Discussion

These results support the hypothesis that contact with a rejected belief system elicits disgust. Christian participants rated a drink to taste more disgusting after writing a passage from

the Qur'an or Richard Dawkins' *The God Delusion*, but not a neutral text. The present findings thus extend past work on moral purity by demonstrating that people can be disgusted by not only impure objects and actions, but also impure information. There are several limitations to the current study, however, including the lack of an ingroup religious text control condition. Further, the effect deserves replication before drawing any firm conclusions. The second experiment thus aimed to replicate and extend the present findings by including a cleanliness manipulation as well as a Bible condition to investigate the hypothesis that participants will not show the same disgust response after contact with an ingroup religious passage.

2.5 Figures

Figure 1. Mean differences in disgust ratings of beverages by condition. Higher values on this scale indicate that the second drink (after writing the passage) was rated more disgusting than the first drink (before writing the passage). Error bars represent +/- 1 standard error.



CHAPTER 3

EXPERIMENT 2

3.1 Overview

Experiment 2 examined whether the disgust reaction observed in Experiment 1 might be extinguished or reversed if participants are given an opportunity to purify themselves following contact with the rejected belief. Further, an ingroup religious passage condition was included to verify that participants *are not* disgusted by a passage from their own faith (i.e., that their own religious text is not perceived as a source of moral impurity). As discussed in section 1.2.3, recent research has suggested that everyday language associating physical cleanliness with moral purity is more than just a metaphor—that is, feelings of moral uncleanliness are accompanied by feelings of physical uncleanliness. If participants literally feel dirty after contact with a rejected religious text, physical cleansing may reduce those feelings of moral impurity (i.e., disgust). Using a hand-washing manipulation (see Lee & Schwarz, 2010b), participants in Experiment 2 either washed their hands or not following exposure to an accepted/rejected religious text (Qur'an/Bible/Dictionary). For participants writing a passage from the Qur'an, I predicted that post-contact disgust would remain in the absence of hand-washing (thus replicating the results of Experiment 1). However, I predicted that post-contact disgust would be attenuated for participants who cleaned their hands with an antiseptic wipe after contact. Conversely, I predicted that contact with the accepted religious text (i.e., the Bible) would not elicit disgust because it is not a source of moral impurity for Christians. No firm *a priori* predictions were made concerning the effect of hand-washing after contact with the Bible.

3.2 Method

3.2.1 Participants

147 self-reported Christian undergraduates participated for partial course credit. Six people were excluded for either failing to follow directions or guessing the hypothesis, leaving 141 participants (50 men, 91 women; mean age = 19.5) included in the analysis.

3.2.2 Materials and Procedure

Participants were randomly assigned to one of the six conditions of a 3 (Passage) x 2 (Antiseptic Wipe) between subjects design. The procedure and materials were the same as in Experiment 1, with the following exceptions. First, participants were asked to estimate the retail price of an individually wrapped antiseptic hand-wipe following the handwriting task, ostensibly as part of the consumer marketing phase of the experiment. Critically, half of the participants were asked to open and use it to wash their hands, and half were instructed only to look at the wipe without using it. Second, a condition using a Bible passage (Romans 5: 8-10) was included, selected as the ingroup religious passage (see Appendix C). Finally, a 7-point version of the religiosity scale used in Experiment 1 was included at the end of the experiment to avoid priming participants before manipulation.

3.3 Results

Disgust difference scores were computed as in Experiment 1. These disgust difference scores were submitted to a 3 (Passage: Qur'an/Bible/Dictionary) x 2 (Antiseptic Wipe: Look/Use) ANOVA. The predicted Passage x Wipe interaction was significant $F(2, 135) = 4.1, p = .02$, with no main effect of Passage or Wipe. An investigation of the means in each condition revealed that participants writing a passage from the Qur'an who did not wash their hands had a *higher* disgust difference score ($M = .38, SD = 1.3$) relative to participants who did wash their

hands ($M = -.21$, $SD = 1.5$; $F(1, 135) = 2.1$, $p = .15$). Conversely, participants writing a passage from the Bible who did not wash their hands had a *lower* disgust difference score ($M = -.26$, $SD = 1.6$) relative to participants who did wash their hands ($M = .71$, $SD = 1.6$; $F(1, 135) = 5.8$, $p = .02$). Participants in the dictionary condition showed a much weaker effect between those who did ($M = .04$, $SD = .97$) and did not ($M = .26$, $SD = 1.2$) wash their hands, $F(1, 135) = .3$, $p = .60$.

Similar difference scores were computed for the other drink ratings, but there was no evidence of any significant Passage x Wipe interactions (Bitter $F(2, 135) = .03$, $p = .97$; Delicious $F(2, 135) = 2.5$, $p = .09$; Sour $F(2, 135) = 1.7$, $p = .19$; Sweet $F(2, 135) = 1.2$, $p = .31$) or main effects among these measures.

3.3.1 Religiosity Scale

The religiosity scale again showed strong reliability ($\alpha = .93$; $M = 5.2$, $SD = 1.5$), so a composite measure of religiosity was computed as in Experiment 1. To examine any effect of religiosity, disgust difference scores were submitted to a 3 (Passage: Qur'an/Bible/Dictionary) x 2 (Antiseptic Wipe: Look/Use) ANOVA with the composite measure of religiosity as a covariate. This analysis revealed the predicted Passage x Wipe interaction, $F(2, 131) = 7.7$, $p = .001$, as well as a significant main effect of Passage, $F(2, 131) = 6.8$, $p = .002$, and a Passage x Religiosity interaction, $F(2, 131) = 6.6$, $p = .002$. The main effect of Passage reflected the fact that participants in the Bible condition had a higher estimated marginal mean disgust difference score ($M = .31$) than participants in the Qur'an ($M = .19$) or Dictionary ($M = .20$) conditions.

To further investigate the Passage x Religiosity interaction, a religiosity factor was created by coding participants who fell below the midpoint of the religiosity scale as "low" ($n = 25$), and those above the midpoint of the scale as "high" ($n = 116$). Simple effects tests of religiosity (high vs. low) within each passage condition revealed that low religiosity participants

had a significantly *higher* disgust difference score ($M = 2.4$) than high religiosity participants ($M = -.10$) in the Bible condition ($F(1, 131) = 17.4, p < .001$). Low religiosity participants also had a significantly *lower* disgust difference score ($M = -.99$) than high religiosity participants ($M = .28$) in the Qur'an condition ($F(1, 131) = 5.8, p = .02$).

These findings prompted two subsequent 3 (Passage: Qur'an/Bible/Dictionary) x 2 (Antiseptic Wipe: Look/Use) ANOVA's: one among high religiosity participants, and one among low religiosity participants. Among high religiosity participants, the Passage x Wipe interaction remained highly significant, $F(2, 110) = 7.2, p = .001$ (see Figure 2), with no main effect of Passage or Wipe. Examining the simple effect of Antiseptic Wipe (look vs. use) within each level of the Passage factor revealed a marginally significant difference in the Qur'an condition ($M_{Look} = .65, M_{Use} = -.1, F(1, 110) = 3.3, p = .07$), a significant difference in the Bible condition ($M_{Look} = -.76, M_{Use} = .57, F(1, 110) = 10.2, p = .002$), and no significant difference in the Dictionary condition ($F(1, 110) = 1, p = .30$).

Among low religiosity participants, there was a main effect of Passage ($F(2, 19) = 9.5, p = .001$), with no main effect of Wipe or a Passage x Wipe interaction.

3.3.2 Affect

Composite positive and negative affect scores were again computed by averaging ratings made after tasting beverage A (PA $\alpha = .79, M = 2.6, SD = .84$; NA $\alpha = .60, M = 1.4, SD = .44$) and after tasting beverage B (PA $\alpha = .82, M = 2.5, SD = .87$; NA $\alpha = .72, M = 1.3, SD = .47$). Including difference scores of these composite positive/negative affect values as covariates in the first analysis revealed no main effects or interactions with affect, suggesting that positive or negative affect does not account for the present findings.

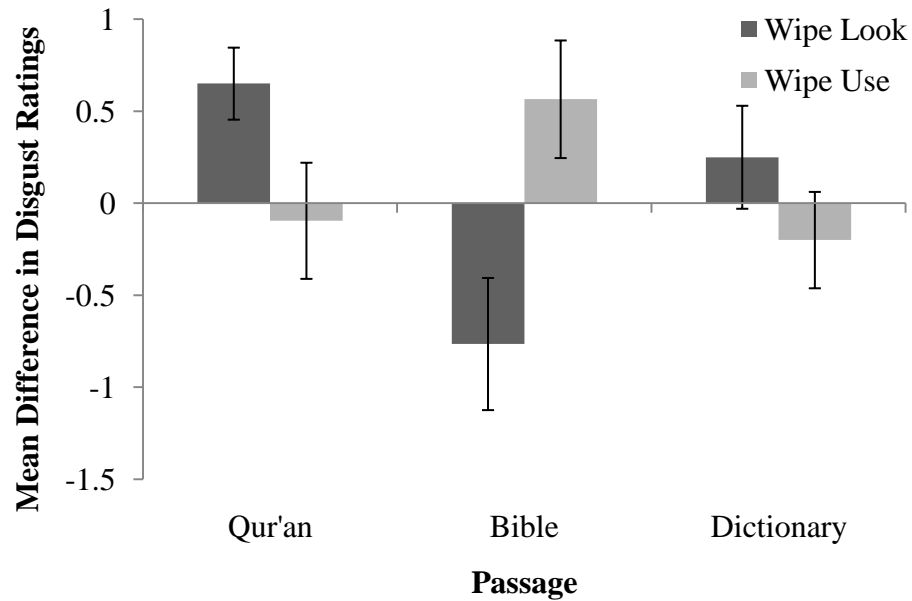
3.4 Discussion

Study 2 replicated the effect of Study 1—the second drink was rated to be more disgusting after contact with a rejected religious text, particularly for highly religious participants (i.e., those who value their religion as an important part of their identity). Study 2 also extended the results of Study 1 by demonstrating that the disgust response could be removed with hand washing. This finding is consistent with previous research on the link between physical cleanliness and moral purity, suggesting that hand-washing reduced feelings of moral impurity (i.e., disgust) after contact with the rejected religious passage.

Further, the inverse effect was found among participants writing a passage from the Bible: Christians writing a passage from the Bible rated the second drink as less disgusting if they did not wash hands, but more disgusting if they did wash their hands. Recall that hand washing in Schnall et al.'s (2008) study caused participants to become *less* sensitive to violations of moral purity after watching a disgusting video (i.e., a feeling of moral *impurity* had been removed through physical cleansing). In the present research, hand washing after writing a passage from the Bible appears to have caused participants to become *more* sensitive to purity violations (i.e., a feeling of moral *purity* was removed through physical cleansing). These results thus provide initial evidence that physical cleansing can symbolically remove both negative *and* positive contagion. The implications of these findings are discussed in more detail below.

3.5 Figures

Figure 2. Mean differences in disgust ratings of beverages in each Passage x Wipe condition among highly religious participants (n = 116). Higher values on this scale indicate that the second drink (after writing the passage) was rated more disgusting than the first drink (before writing the passage). Error bars represent +/- 1 standard error.



CHAPTER 4

GENERAL DISCUSSION

Two studies provide evidence that contact with rejected belief systems produces a disgust response. In Experiment 1, Christian participants rated a drink to taste more disgusting after writing a passage from the Qur'an or Richard Dawkins' *The God Delusion*, but not a control text. Of key importance, the effect was removed (and even reversed) in Experiment 2 when participants were instructed to clean their hands after copying the passage. This suggests that contact with rejected religious beliefs constitutes a violation of the ethic of purity, and that physical cleansing restored a sense of moral purity following contact. Moreover, these results are consistent with past theory and research suggesting that disgust has evolved to protect both the physical and spiritual body from impurity. That is, concerns for purity provide an important foundation for our judgments of right and wrong, and feelings of moral impurity (i.e., disgust) are embodied, leaving people feeling physically unclean after contact with impure beliefs.

Strikingly, the inverse effect was found for Christians writing a passage from the Bible; the second drink was rated *less* disgusting for those who did not wash their hands, and *more* disgusting for those who did. Whereas most research on the embodiment of the physical/moral purity metaphor has focused on cleaning off negative contagion (e.g., Lee & Schwarz, 2010a; Zhong & Liljenquist, 2006), the present results provide initial evidence that both negative *and* positive contagions can be removed through physical cleansing. Thus, while these data are consistent with the law of contagion which suggests that people are hesitant to come into contact with any object that has been tainted by a negative essence (Rozin, Millman, & Nemeroff, 1986), participants writing a passage from the Bible may have been equally averse to removing its positive essence by washing their hands. That is—feelings of moral *purity* removed through physical cleansing may lead people to become *more sensitive* to purity violations, and feelings of

moral *impurity* removed through physical cleansing may lead people to become *less sensitive* to purity violations. To the best of my knowledge this is the first finding of its kind and has clear parallels in other domains, such as the athlete who refuses to wash her lucky pair of socks, or the rabid fan who goes weeks without washing their cheek after its been kissed by a celebrity. People often find it aversive to remove a positive essence and may even find themselves increasingly susceptible to negative outcomes once a positive essence has been removed (e.g., “I won’t play well without my lucky socks!”). At this point, however, these insights are largely speculative, and further research is necessary to more fully understand the psychological processes underlying this phenomenon.

These results also have clear implications for intergroup relations. Can we ever have peace between groups that are fundamentally disgusted by each other? Theory and research has shown that our moral judgments are powerfully guided by automatic intuitions—that we perceive something as wrong because it *feels* wrong, not because we have reasoned that it is wrong (Haidt, 2001). This suggests that perhaps the problem is intractable. Efforts to achieve inter-religious understanding and cooperation are actually working against the evolved psychological mechanisms that function to protect and maintain personal purity and ingroup solidarity. However, these automatic intuitions are also possible to overcome or even change given the appropriate circumstances (Haidt, 2001), suggesting that—however improbable—peaceful inter-religious relations are at least theoretically possible.

Finally, this research contributes to the nascent line of research on the morality of *beliefs*. Recall that Harris et al. (2008) recently found that areas of the brain associated with disgust and taste perception are activated while reading sentences perceived as false. It is not yet clear, however, whether people are disgusted by falsity in general, or moral falsity specifically. In

other words, would people be disgusted by writing about non-moral falsities (e.g., the moon is made of cheese)? Although I am currently investigating this question, it is possible that people are only disgusted by information that violates personally and culturally valued *moralized* beliefs—that is, beliefs for which there is a perceived moral consequence for believing or disbelieving. Holding *true beliefs* may thus be an important component of one’s sense of moral purity, and an area worthy of future investigation (c.f. Anderson, 2008).

Together, the present research represents an important contribution to the study of morality. Whereas the majority of past work on moral purity has focused on disgust in response to morally questionable objects and actions, these data suggest that morally questionable *beliefs* may be an equally threatening source of impurity. And while I have focused here on reactions to religious beliefs among Christian participants, there are potentially far reaching implications for other populations and other types of moralized beliefs as well (e.g., liberalism vs. conservatism). Investigating the intuitive disgust responses people have toward the mere *ideas* and *beliefs* of other groups may help shed light on these types of culture wars. For now we can conclude that perceiving other Gods as gross and atheism as icky is the natural consequence of an evolved psychological mechanism—namely, the emotion of disgust—that functions to protect one’s physical and spiritual purity. Future research in this area has the potential to lead to important insights in the study of religion and religious cognition, topics that clearly make up an important part of the lives of so many people throughout the world.

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APPENDIX A

Positive/Negative Affect Schedule used in Experiments 1 and 2 (I-PANAS-SF; Thompson, 2007). Items were rated on a 5-point scale (1 = *very slightly or not at all*; 5 = *extremely*).

- 1) In this moment I am feeling upset.
- 2) In this moment I am feeling hostile.
- 3) In this moment I am feeling alert.
- 4) In this moment I am feeling ashamed.
- 5) In this moment I am feeling inspired.
- 6) In this moment I am feeling nervous.
- 7) In this moment I am feeling determined.
- 8) In this moment I am feeling attentive.
- 9) In this moment I am feeling afraid.
- 10) In this moment I am feeling active.

APPENDIX B

Religiosity scale used in Experiments 1 and 2 (Shariff, Cohen, & Norenzayan, 2008). Items were rated on a 5-point scale in Experiment 1 (1 = *strongly disagree*; 5 = *strongly agree*) and a 7-point scale in Experiment 2 (1 = *strongly disagree*; 7 = *strongly agree*).

- 1) My personal religious beliefs are very important to me.
- 2) My religion or faith is an important part of my identity.
- 3) If someone wanted to understand who I am as a person, my religion or faith would be very important in that.
- 4) I believe strongly in the teachings of my religion or faith.
- 5) I believe in God.
- 6) I consider myself a religious person.

APPENDIX C

Passages selected from The Qur'an, Richard Dawkins' *The God Delusion*, The Bible, and Merriam-Webster's Dictionary to serve as stimuli in Experiments 1 and 2.

As for those who are bent on denying the truth and on barring others from the path of God – all their good deeds will He let go to waste; whereas those who have attained to faith and do righteous deeds, and have come to believe in what has been bestowed on high on Muhammad – for it is the truth from their Sustainer – shall attain God's grace: He will efface their past bad deeds, and will set their hearts at rest (The Qur'an, Surah 47: 1-2).

The God of the Old Testament is arguably the most unpleasant character in all fiction: jealous and proud of it; a petty, unjust, unforgiving control freak; a vindictive, bloodthirsty ethnic cleanser; a misogynistic, homophobic, racist, infanticidal, genocidal, filicidal, pestilential, megalomaniacal, sadomasochistic, capriciously malevolent bully (Dawkins, 2006, p. 31).

But God commendeth his love toward us, in that, while we were yet sinners, Christ died for us. Much more then, being now justified by his blood, we shall be saved from wrath through him. For if, when we were enemies, we were reconciled to God by the death of his Son, much more, being reconciled, we shall be saved by his life (Romans 5: 8-10).

The Merriam-Webster dictionary has been created by a company that has been publishing dictionaries for 150 years. It has been edited by an experienced staff of lexicographers, who believe it will serve well those who want a concise and handy guide to the English language of today (Preface to the Merriam-Webster Dictionary, 1997).